The Geology of the Hokitika Sheet, North Westland Quadrangle, with which has been included a small portion of the upper Wilberforce valley, in the Waimakariri Quadrangle. **By James Mackintosh Bell, assisted by Colin Fraser.** Bulletin No. 1 (New Series) New Zealand Geological Survey, Department of Mines, Wellington, New Zealand, 1906. xi and 101 pp., 32 plates, 9 maps, 4 geological sections and 11 micro-photographs.

Every new country must apparently be explored at least twice before it can be said to be fairly well known—once by the explorer, who, in a rapid reconnaissance, discovers the existence and location of its mountains, plains, streams, peoples, etc., and again by the trained geographer or geologist, who, by later detailed examination, checks the earlier determinations, discovers or works out the genesis and relations of structure, topography, and drainage, and describes these in systematic terms, thus making the region intelligible to those to whom all lofty snowclad mountains or low coastal plains are not alike.

New Zealand will certainly become well known in the latter way, if succeeding bulletins of its recently-reorganized Geological Survey live up to the promise of this the first number in the new series, by Dr. James Mackintosh Bell, the Director.

The volume is of special interest to the geographer by reason of the two important chapters, "General Culture" and "The Physical Geography of Westland," in which are described the towns and settlements, means of communication, inhabitants, flora, fauna, soil, and climate of the area referred to in the title. A considerable part of this section is also devoted to a well-phrased description of the most important topographic features.

Westland has long stretches of harbourless coast; and even where harbours occur they are frequently shallow and difficult of entry—a fact which greatly retards the development of the district. Overland communication with the eastern and better-favoured parts of the island is by means of a few roads and more frequent bridle-paths and trails. The last named were used for generations by the Maoris, who migrated to the west coast, and in calm weather searched the shores in canoes for the much-coveted greenstone.

The chief physiographic provinces of Westland, named in order from the hinterland to the shores of the Tasman Sea, are an alpine chain, with many splendid and lofty snow-covered peaks; an elevated and now well-dissected peneplain 4,000 to 5,000 feet above the sea, surmounted by an occasional rounded residual mountain; and a young coastal plain with outliers of the peneplain on its inner margin.

The general direction of the alpine chain is northeast. The structure is synclinal in the main, and the highest peaks consist of grauwacke or sandstone, and stand at elevations varying between 6,000 and slightly over 7,000 feet. Avalanches of snow are of common occurrence at the heads of the higher valleys. These are sometimes of huge proportions, and bring down as low as 3,000 feet quantities of snow so large that they are frequently not melted by the heat of the ensuing summer. Almost every alpine valley has such masses of hardened snow at its head. The glaciers themselves are not large, but are the shrunken remnants of once extensive ice fields and glaciers. An interesting circumstance is the absence, with one exception, of rock-flows in the streams draining the glaciers, due, no doubt, to the inefficiency of the present weak glaciers in eroding the beds of hard rock scoured clean by the former powerful ice-sheet. The common phenomena of glaciation are noted at low as well as at high elevations, and Bell's work on the glacial and fluvio-glacial deposits of this district constitutes, with the work of Agassiz, Gregory, Andrews, Thatcher, and many others, convincing proof of former more extensive glaciation in the

southern as well as the northern hemisphere. *Roches moutonnées*, glacial striæ, and glaciated boulders are common, and can certainly not be questioned in view of the author's extended experience in the glaciated regions of Canada. The V-shaped valleys, represented in the plates and described in the text, are indicative of strong ice erosion, as are also the abruptly truncated spurs of the pre-glacial valleys and the frequent cirques, rapids, falls, and hanging valleys.

The uplifted peneplain (Wainihinihi) has been very deeply dissected, and near the major streams is distinctly mountainous, so that the principal elevations here receive distinctive names—a feature similar to that noted in the Acadian peneplain by Daly. Alpine or subalpine vegetation is found all over the surface of the peneplain, the ranges being quite free from snow at the close of summer. The sides of the valleys carved below the level of the uplifted plain have been smoothed and steepened by ice-action in a significant manner.

The coastal plain, fronting the Tasman Sea on the coast of Westland, is a very complex physical feature. Three distinct cycles of development are noted : an early cycle, in which beds of gravel and clay were raised above the sea and dissected ; a second cycle, in which this dissected plain was submerged, partly buried under new sediments and elevated with remnants of the older plain, standing in relief above the modern feature ; and the present third cycle of development, in which the valleys have become extensively terraced. The present cycle has been complicated by glaciation—a fact accounting for the tremendous amount of irregularly-deposited glacial débris forming much of the surface of the modern coastal plain. The greatest width of the plain is fifteen miles, and the maximum elevation of its inner margin about 600 feet.

Special attention is directed to the maps and excellent photographs accompanying this report, which depict the topographic features, the drainage, the glaciers, etc., of a district practically unknown to American geographers, although earlier papers dealing with other sections of New Zealand had portrayed more or less similar features elsewhere.

It is hoped that future publications in this series will extend the geographic as well as the geologic work begun in the first *Bulletin*, that by this means we shall soon be enabled so have a thoroughgoing and complete regional geography of this interesting island group. I. B.

Uganda to Khartoum: Life and Adventure on the Upper Nile. By Albert B. Lloyd. xii and 312 pp., 80 Illustrations, and map. E. P. Dutton & Co., New York, 1906. (Price, $3.)

This is a record of travel, adventure, and work among the natives of the northern provinces of the Uganda Protectorate, a part of Central Africa very little known to the public. The author is a missionary who has lived ten years in Uganda. His latest book depicts his experiences during a five-years' residence in the northern provinces and describes his journey down the Nile on a vacation trip to Europe.

Mr. Lloyd is one of the comparatively few men who have special capabilities for such pioneering service as he has rendered in Africa. His book is interesting and instructive. It is not a missionary work, and it deals briefly with missionary effort; but it presents Africa as a land of darkness, of fascinating adventure, and of immense possibilities, in whose future the author has unbounded confidence.

The numerous half-tone illustrations give glimpses of many phases of life in Central Africa that could scarcely be imparted so vividly by any written description. Many of them give entirely new aspects. One, for example, shows some half-clad